Abstract

A probe has an acoustic stimulator, such as a loudspeaker, and a microphone. The probe is located in an area to be measured. Acoustic signals are sent by the stimulator and received by the microphone. The signals received by the microphone are transformed into electrical signals and transferred to an analysis unit. Using a defined stimulation followed by a two-port chain transfer matrix connected to an impedance as a model, the voltage ratio between the stimulation and the impedance is described as a dimensionless transfer function in the form of a complex function of the stimulation frequency. A series of acoustic calibration signals are generated by a number of known acoustic impedances covering different calibration scopes by means of the defined stimulation. The calibration signals are recorded and the electric values are merged with the respective voltage values of the stimulation for evaluation of the results of the respective transfer functions. The transfer functions of the calibration signals are merged together into an over-determined linear system of equations. The system of equations is solved and two coefficients are calculated. The impedance to be calculated is determined by evaluating the transfer function under the defined stimulation by use of the coefficients determined by the calibration.